

thought to represent fin-rays, were not organic and had nothing whatever to do with the fish. Similar ridges were to be seen on a specimen with *Paleospondylus* in the Museum of Practical Geology, but had no relation to the fossil.

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The following papers were read:—

1. Note on the Affinities of *Paleospondylus gunni*, Traq.  
In reply to Dr. Bashford Dean, of New York. By  
R. H. TRAQUAIR, M.D., LL.D., F.R.S.<sup>1</sup>

[Received March 16, 1897.]

Those who are acquainted with my papers on *Paleospondylus gunni* will remember that my principal reason, in my last contribution to the subject, for assigning a Marsipobranch affinity to this singular little Devonian organism was the presence of a cirrated opening, presumably nasal, situated in the front of the cranium. My words were:—

“What is the nature of this aperture with its strange fringe of cirri? It cannot be a sucker like that of the larval *Lepidosteus*. . . . . The more obvious comparison—and that which is in harmony with the rest of the structure of our fossil—is that with the single nasal opening of *Myxine* or *Petromyzon*. And if this view be the right one, then *Paleospondylus* is monorhinal, and is a Marsipobranch.”<sup>2</sup>

I was therefore not a little surprised to find the following statement by Dr. Bashford Dean at p. 70 of his recent work on ‘Fishes Living and Fossil,’ published after he had received and read the paper from which the above extract is quoted:—“There can be no doubt that *Paleospondylus* possessed a ring-like mouth surrounded by barbels like those of a Myxinoid, and that it lacked paired fins.”

Not that Dr. Dean seems to *dispute* my reference of the cirrated opening to a nasal category—on the contrary he reproduces my restoration of *Paleospondylus* without raising any question of the kind. So I can only conclude that he did not read my description with that amount of care which would have prevented so serious a misunderstanding of my words, which surely could not have been plainer.

In this work, however, the author looks favourably on the idea of the Marsipobranch affinities of *Paleospondylus*, even to the extent of speaking of it as “the fossil remains of what seems undoubtedly a Lamprey” (p. 65).

More recently, however, Dr. Dean has seen reason to change this opinion after examining a specimen of *Paleospondylus* which

<sup>1</sup> Communicated by A. SMITH WOODWARD, Esq., F.Z.S.

<sup>2</sup> Proc. Roy. Phys. Soc. Edinb. vol. xii. 1894, p. 314.

had been sent to him by Mr. W. T. Kinnear, of Forss near Thurso. His interpretation of this specimen, along with a magnified figure, will be found in a paper entitled "Is *Palæospondylus* a Cyclostome?" published in the 'Transactions of the New York Academy of Sciences' for 1896 (vol. xv.).

Here (pp. 101, 102) Dr. Dean states that in this specimen "a dusky band may, on either side, be traced tailward from the region of the 'auditory capsules.' These bands when examined with a glass are found to resolve themselves into a series of ray-like structures arranged transversely to the axis of the body, but slightly inclined backward . . . . . They cannot be said to definitely take their origin from post-occipital plates, although they certainly appear to, and there is a suggestion that the right occipital plate has been formed of metameral elements. The band of ray-like structures continues, however, caudad of the pectoral region, traceable backwards to the region of about one-half the length of the vertebral axis. . . . . Negative as well as positive evidence, accordingly, indicates that these fin-like rays were concerned with the presence of paired fins. If this be true, is *Palæospondylus* to be regarded as a Marsipobranch?" The paper finishes with an arrangement in tabular form of the evidence for and against the marsipobranch affinities of *Palæospondylus*, from which it would appear that he still looks upon the cirrated opening as a "mouth," and that he thought the post-occipital plates may "well represent basalial of pectoral fins." After all, the only conclusion to which the author comes is that "the position of the fossil, if not to be regarded as marsipobranchian, is certainly undefinable."

As Dr. Dean has been so extremely kind as to send his specimen over to this country that we may examine it for ourselves, I am enabled by this act of courtesy on his part to offer a few words as to *my* interpretation of the appearances presented by it.

It belongs to the class of specimens which may be designated as moderately good. The black substance of the skull and vertebræ is fairly well preserved, but the surface is gone. The post-occipital plates are not well preserved, so that the "suggestion" as to one of them being formed of "metameral elements" is absolutely without value. The vertebral centra are in pretty good condition, some of them in front being so turned up as to show their ring-like conformation with great distinctness. These are the parts seen on the specimen; if there were anything more we should expect it to be preserved in the same way.

On examining the specimen with a low power, taking care to turn the head towards the light, we see the dusky band clearly enough on the right<sup>1</sup> side, though it is scarcely perceptible on the opposite one; and we also see the appearance of this band being divided into transversely directed ray-like bodies. Then if we turn round the fossil so that the light may strike on the vertebral column from the convex side, then the dusky band with its ray-like markings at once disappears—but not so the black substance of

<sup>1</sup> In reality the *left* side, as the specimen, as usual, lies on its back.

the rest of the fossil. Then if we examine the specimen further with a higher power, we should find that these striated markings contain not a particle of organic tissue—they are mere *shadows*; so that Dr. Dean's expression "a series of ray-like *structures*" is surely inapplicable to them, and the figure of them which he gives in his paper is quite misleading.

There is no doubt that the outer margin of the "dusky band," lettered "marginal body-wall" in Dr. Dean's figure, represents a slightly elevated ridge on the stone, and that the "ray-like structures" are slight furrows brought into relief only when the specimen is so held that the light brings out their *shadows*.

The next thing to be observed is that these ray-like shadows are not limited to a position internal to the line B.W. in Dr. Dean's figure, but extend beyond it towards a second longitudinal line parallel with the first, and there is even an indication of a third one. Furthermore, if we examine the whole surface of the stone, carefully turning it so that the light may fall on it from various directions, we shall be surprised to find indications of similar striated markings cropping up here and there quite apart from the fossil.

Consequently my belief has come to be, that these markings, considered by Dr. Bashford Dean to be rays of a pectoral fin, are petrological and not palæontological in their nature—that they are, in fact, inorganic and have nothing to do with the fossil itself, which stands clearly out from them in its deep black contour of calcified cartilage.

But even if these markings were organic and belonged to the specimen of *Palaospondylus* with which they are associated, Dr. Dean's interpretation of them is still inconsistent. For if the outer edge of his "dusky band," marked B.W. in his figure, be really the "marginal body-wall," then his supposed "radial-like supports (of paired fins)," which pass inwards from this line, must, according to his own theory of the paired fins, be "basals" and not "radials." Nevertheless he also says of the post-occipital plates that they "might well represent basalia of pectoral fins."

Apparently still under the conviction that the cirrated ring which I have interpreted as nasal is oral in its nature (how a mouth could go directly into the front of the cranium I fail to see), he leaves the nose, upon which I have naturally placed the principal weight, altogether out of consideration in his summary of characters for and against the marsipobranch affinities of *Palaospondylus*. And note his remark: "Moreover it is possible that the ventral 'cirrhi' are displaced structures from the cranial region, as one of the specimens examined by the present writer seems to indicate." Of course these "ventral cirrhi," namely the cirri on the ventral half of the nasal ring, are cranial structures, and I certainly did not describe them as anything else! It is really a matter for regret that Dr. Dean did not, as it would seem, read my paper with a little more care. Although Dr. Dean admits that the caudal fin of *Palaospondylus* is "essentially marsipobranchian,"

he adds that "its diphyrcercal (or perhaps heterocercal) condition" is also common to many groups. Well, I have never seen a "heterocercal" *Palæospondylus* in spite of the many specimens with well-preserved tails which have come under my observation. Nor have I, although I must have examined nearly two hundred examples of the little creature in question, many of them in a much better state of preservation than the one which is the special subject of this paper, ever seen anything like the shadowy furrows interpreted by Dr. Dean as pectoral fin-rays.

Therefore I must, in conclusion, state my belief that the examination of this specimen leaves the question of the affinities of *Palæospondylus* precisely where it was after I had written my last paper on the subject.

My warmest thanks are, however, due to Dr. Bashford Dean for his kindness and generosity in sending his specimen again across the Atlantic for re-examination by British palæichthyologists.

## 2. On a Collection of Mammals from North and North-west Australia. By R. COLLETT.

[Received February 10, 1897.]

(Plate XXIII.)

Mr. Knut Dahl, a young naturalist, returned to Norway in May 1896, after spending three years, from 1893 to 1896, in South Africa and Australia for the purpose of collecting zoological specimens for the University of Christiania.

In June 1894 he arrived at Port Darwin, in North Australia, and at once commenced his researches in the inner districts of Arnhem Land. He subsequently visited Victoria River (south of Arnhem Land), and finally remained at Roebuck Bay, North-west Australia, from October 1895 to February 1896, where he likewise obtained interesting collections. He collected altogether examples of 34 species of Mammals, 31 of which may be identified. Besides this, several others were observed without being procured. Two of the species of which specimens were brought home I consider new to science (*Pseudochirus dahlia* and *Sminthopsis nitela*), and several of the others are rare and seldom met with in collections.

I shall therefore append a short account of the Mammals which have been brought home and which are all preserved in the Zoological Museum at Christiania, and add to it a short description of the most important of the places visited, together with their peculiarities, from the reports I have received of them from Mr. Dahl.

I owe my thanks to my friend Mr. Oldfield Thomas for having assisted me in determining some of the more doubtful specimens.

Characteristic of the whole of Arnhem Land is a mighty forest, which more or less covers the entire country.

*Port Darwin*, the first locality visited, is characterized by flat,